

**CLAIMS**

1. A composition comprising (1) repeat units derived from a carbonyl compound and a glycol and (2) one or more ultrafine metal oxides having a particle size smaller than about 0.1  $\mu\text{m}$ .
- 5 2. A composition according to claim 1 wherein said ultrafine metal oxide has a particle size smaller than about 0.05  $\mu\text{m}$ .
3. A composition according to claim 1 wherein said ultrafine metal oxide has a particle size smaller than about 100 nm.
4. A composition according to claim 1 wherein said ultrafine  
10 metal oxide is beryllium oxide, magnesium oxide, calcium oxide, strontium oxide, barium oxide, boron oxide, aluminum oxide, gallium oxide, zinc oxide, or combinations of two or more thereof.
5. A composition according to claim 2 wherein said ultrafine metal oxide is magnesium oxide.
- 15 6. A composition according to claim 3 wherein said ultrafine metal oxide is magnesium oxide.
7. A composition according to claim 6 wherein said carbonyl compound is terephthalic acid or ester thereof and said glycol is ethylene glycol.
- 20 8. A process comprising contacting, in the presence of one or more ultrafine metal oxides, a carbonyl compound with a glycol under a condition sufficient to produce polyester.
9. A process according to claim 8 wherein said ultrafine metal oxide has a particle size smaller than about 0.05  $\mu\text{m}$ .
- 25 10. A process according to claim 8 wherein said ultrafine metal oxide has a particle size smaller than about 100 nm.
11. A process according to claim 8 wherein said ultrafine metal oxide is beryllium oxide, magnesium oxide, calcium oxide, strontium oxide, barium oxide, boron oxide, aluminum oxide, gallium oxide, zinc oxide, or  
30 combinations of two or more thereof.

12. A process according to claim 9 wherein said ultrafine metal oxide is magnesium oxide.

13. A process according to claim 10 wherein said ultrafine metal oxide is magnesium oxide.

5 14. A process according to claim 14 wherein said carbonyl compound is terephthalic acid or ester thereof and said glycol is ethylene glycol.

10 15. A process for substantially removing, or reducing the content of, an aldehyde in a glycol comprising contacting said glycol with at least one metal oxide.

16. A process according to claim 15 wherein said metal oxide or is beryllium oxide, magnesium oxide, calcium oxide, strontium oxide, barium oxide, boron oxide, aluminum oxide, gallium oxide, zinc oxide, or combinations of two or more thereof.

15 17. A process according to claim 16 wherein said metal oxide is magnesium oxide or ultrafine magnesium oxide.

18. A process according to claim 17 wherein said aldehyde is acetaldehyde and said glycol is ethylene glycol.

20 19. A process comprising (1) contacting, in the presence of a catalyst and optionally at least one ultrafine metal oxide, a carbonyl compound with a glycol under a condition sufficient to produce polyester wherein said glycol has been pretreated with at least one metal oxide or (2) incorporating at least one ultrafine metal oxide into or onto a polyester.

25 20. A process according to claim 19 wherein said process comprises contacting, in the presence of a catalyst and at least one ultrafine metal oxide, a carbonyl compound with a glycol under a condition sufficient to produce polyester wherein said glycol has been pretreated with a metal oxide.

30 21. A process according to claim 20 wherein said ultrafine metal oxide has a particle size smaller than about 0.05 mm.

22. A process according to claim 20 wherein said ultrafine metal oxide has a particle size smaller than about 100 nm.

23. A process according to claim 20 wherein said ultrafine metal oxide or said metal oxide is beryllium oxide, magnesium oxide, calcium oxide, strontium oxide, barium oxide, boron oxide, aluminum oxide, gallium oxide, zinc oxide, or combinations of two or more thereof.

24. A process according to claim 21 wherein said ultrafine metal oxide is magnesium oxide.

25. A process according to claim 22 wherein said ultrafine metal oxide is magnesium oxide.

26. A process according to claim 25 wherein said carbonyl compound is terephthalic acid or ester thereof and said glycol is ethylene glycol.

27. A process according to claim 19 wherein said process comprises incorporating said at least one ultrafine metal oxide into or onto said polyester.

28. A process according to claim 27 wherein said ultrafine metal oxide is beryllium oxide, magnesium oxide, calcium oxide, strontium oxide, barium oxide, boron oxide, aluminum oxide, gallium oxide, zinc oxide, or combinations of two or more thereof.

29. A process according to claim 28 wherein said ultrafine metal oxide is magnesium oxide.

30. A process according to claim 28 wherein said polyester is polyethylene terephthalate.

25